ABSTRACT OF THE DISCLOSURE

A Raman ring resonator based laser and wavelength converter method and apparatus. In one aspect of the present invention, the disclosed method includes directing a first optical beam of a first wavelength and a first power level into a first ring resonator defined in a semiconductor material. Emission of a second optical beam of a second wavelength is caused in the first ring resonator by propagating the first optical beam around the first ring resonator. The first power level is sufficient to cause the emission of the second optical beam. The first optical beam is directed out of the first ring resonator after a round trip of the first optical beam around the first ring resonator. The second optical beam is recirculated around the first ring resonator to further stimulate the emission of the second optical beam in the first ring resonator.